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CLAIMS

1. A method of detecting a target molecule comprising the steps of:

a) contacting a sample with two or more binding entities;

b) allowing the binding entities to bind to the target molecule;

c) allowing interaction between nucleic acid tags attached to the binding entities, wherein the interaction generates at least one tag comprising novel sequence, and wherein the nucleic acid tags are not covalently cross-linked following the interaction;

d) detection of novel sequence in at least one tag generated in step c).

2. A method of detecting interactions between two or more interacting molecules comprising the steps of:

a) incubating the interacting molecules such that they can interact;

b) allowing interaction between nucleic acid tags attached to the interacting molecules, wherein the interaction generates at least one tag comprising novel sequence, and wherein the nucleic acid tags are not covalently cross-linked following the interaction;

c) detection of novel sequence on at least one tag generated in step b).

3. A method according to claim 1 or claim 2

wherein the interaction between nucleic acid tags occurs by recombination.

4. A method of detecting a target molecule comprising the steps of:

a) contacting a sample with two or more binding entities;

b) allowing the binding entities to bind to the target molecule;

c) recombination between nucleic acid tags attached to the binding entities thus generating novel sequence;

d) detection of novel sequence generated by recombination between the nucleic acid tags.

5. A method of monitoring an interaction between interacting molecules comprising the steps of:

a) incubating the interacting molecules together such that they can interact;

b) recombination between nucleic acid tags attached to the interacting molecules thus generating novel sequence;

c) detection of novel sequence generated by recombination between the nucleic acid tags.

6. A method according to claim 4 or claim 5 wherein recombination generates two separate nucleic acid tags, each of which has a novel sequence.

7. A method according to any one of claims 3 to 6 wherein recombination is site-specific and relies upon the use of at least one recombinase enzyme.

8. A method according to claim 7 wherein the recombination is dependent upon attP and attB recognition sequences.

9. A method according to claim 7 wherein the recombination is dependent upon Cre recombinase and LoxP sites.

10. A method according to any one of claims 2 to 6 wherein recombination depends upon the use of at least one transposase enzyme.

11. A method according to claim 10 wherein the recombination depends upon Tn5 transposase that recognizes Mosaic Ends recognition sequences.

12. A method according to any one of claims 7 to 11 wherein the recombinase or transposase is activated after addition to the reaction.

13. A method according to claim 12 wherein the recombinase or transposase is activated by adding an activating buffer to the reaction.

14. A method according to any one of claims 3 to 6 wherein recombination occurs by virtue of homologous recombination between the nucleic acid tags.

15. A method according to any one of the preceding claims wherein the nucleic acid tags are attached directly to the binding entities or interacting molecules.

16. A method according to any one of claims 1 to

14 wherein the nucleic acid tags are attached indirectly to the binding entities or interacting molecules.

17. A method according to any one of the preceding claims wherein the nucleic acid tags comprise of double-stranded DNA or double-stranded RNA.

18. A method according to any one of the preceding claims wherein the nucleic acid tags are linear or circular, or a mixture thereof.

19. A method according to claim 1 or claim 4 wherein the two or more binding entities bind to equivalent sites within identical monomeric units of a multimeric target molecule.

20. A method according to claim 1 or claim 4 wherein the two or more binding entities bind to different regions of the target molecule.

21. A method according to any one of the preceding claims which is carried out in the presence of one or more competitor molecules.

22. A method according to claim 21 wherein the competitor molecules are capable of interacting with at least one of the nucleic acid tags.

23. A method according to claim 22 wherein the competitor molecules can interact with at least one of the nucleic acid tags by recombination.

24. A method according to any one of claims 21 to 23 which is carried out entirely in solution.

25. A method according to any one of the preceding claims wherein the detection of novel sequence is carried out by amplification of at least a part of the novel sequence.

26. A method according to claim 25 wherein amplification is carried out by PCR, NASBA or 3SR.

27. A method according to any one of the preceding claims wherein detection of the novel sequence is carried out in real-time.

28. A method according to claim 27 wherein detection of the novel sequence comprises real-time detection of the product of an amplification reaction using molecular beacons.

29. A method according to any one of the preceeding claims wherein each of the interacting molecules or binding entities are labeled with multiple nucleic acid tags.

30. A method according to claim 29 wherein each interacting molecule or binding entity is labelled with between 2 and 100 nucleic acid tags.

31. A reagent kit comprising two or more binding entities each labelled with nucleic acid tags, characterized in that the nucleic acid tags are capable of interacting to generate at least one tag comprising novel sequence, wherein the nucleic acid

tags are not covalently cross-linked following the interaction.

32. A reagent kit for use in monitoring molecular interactions comprising two or more interacting molecules each labelled with nucleic acid tags, characterized in that the nucleic acid tags are capable of interacting to generate at least one tag comprising novel sequence, wherein the nucleic acid tags are not covalently cross-linked following the interaction.

33. A reagent kit according to claim 31 or claim 32 wherein the nucleic acid tags are capable of interacting by recombination.

34. A reagent kit comprising two or more binding entities each labelled with nucleic acid tags, characterized in that the nucleic acid tags are capable of recombination to generate at least one tag having novel sequence.

35. A reagent kit for use in monitoring molecular interactions comprising two or more interacting molecules each labelled with nucleic acid tags, characterized in that the nucleic acid tags are capable of recombination to generate at least one tag having novel sequence.

36. A reagent kit according to any one of claims 33 to 35 which further comprises a recombinase.

37. A reagent kit according to claim 36 wherein the nucleic acid tags comprise LoxP sites and the

recombinase is Cre recombinase.

38. A reagent kit according to claim 36 wherein at least one of the nucleic acid tags contains an attP sequence and at least one nucleic acid tag, other than the tag containing the attP sequence, contains an attB sequence, and the recombinase is capable of catalysing site-specific recombination between attB and attP sequences.

39. A reagent kit according to claim 36 wherein at least one of the nucleic acid tags contains an attL sequence and at least one nucleic acid tag, other than the tag containing the attL sequence, contains an attR sequence, and the recombinase is capable of catalysing site-specific recombination between attL and attR sequences.

40. A reagent kit according to any one of claims 33 to 35 which further comprises a transposase.

41. A reagent kit according to claim 40 wherein the nucleic acid tags comprise Mosaic Ends recognition sequences and the transposase is Tn5 transposase.

42. A reagent labelling kit comprising two or more nucleic acid tags and means for attaching the tags to interacting molecules or to binding entities, characterized in that the kit contains at least one pair of nucleic acid tags which are capable of interacting to generate at least one tag comprising a novel sequence, wherein the two tags are not covalently cross-linked following the interaction.

43. A reagent labelling kit according to claim 42 wherein the nucleic acid tags are capable of interacting by recombination.

44. A reagent labelling kit comprising two or more nucleic acid tags and means for attaching the tags to interacting molecules or binding entities, characterized in that the kit contains at least one pair of nucleic acid tags which are capable of recombination to generate at least one tag having novel sequence.